Atlantic Richfield Company

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May 5, 2014

Mr. Steven Way
On-Scene Coordinator
Emergency Response Program (8EPR-SA)
US EPA Region 8
1595 Wynkoop Street
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Delivered via e-mail

Subject: Solids Repository Engineering Design and Operation Plan, Rico, Colorado
Response to EPA Comments dated April 5, 2014
Rico-Argentine Mine Site – Rico Tunnels
Operable Unit OU01, Rico, Colorado

Dear Mr. Way,

Atlantic Richfield Company provides the following response to United States Environmental Protection Agency, Region 8 (EPA) comments from your letter to Mr. Anthony Brown dated April 5, 2014 regarding the Solids Repository Engineering Design and Operations Plan (EDOP) for the Rico-Argentine Mine Site located near Rico, Colorado.

Revisions to the EDOP are currently in process incorporating comments from both the EPA and the Colorado Department of Public Health and Environment (CDPHE). A copy of the revised EDOP will be provided to EPA upon completion of the revisions.

A response to each individual EPA comment is provided below.

1. As previously determined in reviewing the site conditions and options to locate the repository, the proposed location is reasonable.

   Response: Comment noted.

2. The slope stability modeling considered the strength of the interface between the HDPE liner and the underlying soil as a potential weak plane. Did the stability analysis evaluate the interface of the geotextile and gravel to be placed onto the top of the geotextile? The gravel source has not yet been determined, rounded gravel (either commercial source or processed from an on-site borrow location) placed on a geotextile might have a low interface friction angle. The stability analysis must consider this aspect of the design and the results provided in the report.

   Response: The large-strain interface friction angle between the textured HDPE membrane and the non-woven geotextile is reported by the manufacturer and an independent laboratory test as 17 to 18 degrees. This is lower than the interface friction angle between the geotextile and the overlying gravel drain material (generally above 20 degrees). Because these two interfaces are so close together in relation to the overall scale of the potential failure surfaces appropriately analyzed, only the lower of these two values is entered into the slope stability analyses and the random search criteria is allowed to locate this layer if it results in the lowest factor of safety.

3. Run-on drainage channels are designed based on a trapezoidal channel with a 2.0 foot bottom width; however, section F on design drawing C-160 shows a 6-inch thick layer of gravel, which reduces the channel bottom width to 1.76 feet. The appropriate change is required to either widen the excavated channel bottom to about 2.3 feet wide to provide a channel equal to the calculations, or if the flow calculations support a smaller channel dimension, then reflect the smaller channel size that would be constructed if the present drawing details are followed.

   Response: The design drawings show the bottom channel width to be 2.0 feet wide (prior to placement of gravel). The design calculations have been revised to account for placement of gravel (effective bottom width 1.76 feet) and channel configuration is adequate for design flow. Revised calculation will be provided in the updated EDOP.

4. The design proposes to line the channels with a 30 mil geomembrane liner; this thickness of liner is more susceptible to installation damage and operational degradation. A thicker liner would be more durable. Using the same 60-mil liner that will line the repository would simplify construction by using one geomembrane product at the site. The change would have minimal impact upon project costs and provide a more durable result.

   Response: The 30 mil geomembrane liner has been replaced with a 60 mil liner. Revised design drawings showing this change will be provided in the updated EDOP.

5. It is stated that a stabilized routing of run-off from the final cover surface for the 100-year flood event would be provided. No contours or cross-section is presented for the completed cell at full build-out. Drawing C-180 implies a mound having a flat top with slopes down towards the mountain side and down towards pond Nos. 15 and 18. If this type of configuration is constructed, an armored channel to remove runoff from the repository would be needed, and measures such as sloping the top inward or placing a low-height perimeter berm around the top would be needed to prevent concentrated runoff from flowing over the crest of the 3H:1V slopes and causing erosion.

   The slope stability analysis shows a more preferable configuration with the top of the repository meeting the mountainside. If the top is sloped back towards the mountain away from the repository side slopes then there would be a drainage channel where the top of the repository joins the mountain and an armored down chute could be provided. The cap configuration needs further evaluation as a function of the quantity of material that will ultimately be placed, and this aspect of the future build out must be addressed in the design report.
   Response: The design drawings have been revised to show the Phase 1 final cover surface with a portion of the final cover sloping back toward the mountainside (to the east) at a slope of 3H:1V. This portion of runoff will be collected within the same storm water channel that collects run-on from the hillside above the repository. The storm water run-on channels are sufficiently sized to handle the additional flow from the Phase 1 final cover. Armored down chutes have been provided to drain water from this channel down the north and south sides of the repository embankment.

6. Page 5-3 of the plan calls for a temporary cover to protect against wind erosion with 18 inches of combined on-site processed material and topsoil. If the temporary cover is intended for annual protection then a lesser thickness may be adequate. One (1) foot of cover, or 4 to 6 inches of gravel/cobbles processed from on-site material and no topsoil may be sufficient unless there is an unstated design and/or operating assumption.

Response: A lesser thickness of interim cover without topsoil is more economical while satisfying the interim cover requirements. The excess cut material generated from the repository excavation will be available and dedicated for the intermediate and final covers. The soil will be processed as necessary to meet these interim cover requirements. These modifications will be incorporated into the EDOP.

7. The stability analysis included analysis for both drained and un-drained conditions with failure indicated for the un-drained static case. An un-drained seismic case was not run. Based on the results, the geogrids must be used for long-term stability if the repository is expanded beyond the initial phase.

   Response: It may be presumed that if the undrained static case requires reinforcement for the stacking scenario, then such would be required for a seismic loading of the same geometry, considering that the typical solids are more than 70% silt-sized particles with high moisture content and low void ratio, each contributing criteria to instability in a seismic event. If stacking of solids is found necessary in the future, reinforcement such as a geogrid would be required and the type of reinforcement will be reconsidered and reanalyzed based on the specific properties of the solids to be stacked.

8. There is no provision for cleanouts for the drain pipes in the repository. If the pipes were to clog some of the material may become saturated, and the stability analysis results may not be valid. Cleanout access or a manhole near the liner penetration needs to be provided to allow a means of maintaining drained conditions in the repository. Appropriate plans for monitoring and maintenance of this condition must be included.

   Response: Cleanouts have been added to the design to allow a means of maintaining drained conditions in the repository and cleanout procedures will be included in an operations plan for the facility. Revised design drawings showing this change will be provided in the updated EDOP.

If you have any questions, please feel free to contact me at (951) 265-4277.

Sincerely,

Anthony R. Brown
Project Manager
Atlantic Richfield Company

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